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## Chapter 7 — ISL Implementation

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### Overview

This chapter contains the information required to implement ISL on the Meridian 1 Option 11 system. It provides:

- hardware and software installation
- programming the hardware and software components necessary to provide basic call service

ISDN-related features are treated individually in the chapter titled "Feature Implementation."

**Note:** This chapter builds on the ESN programming that is assumed to be already in place. It is also assumed that the installation technician has a basic understanding of NARS and CDP. (See Appendix A for additional information on ESN).

Two modes of ISL are available: shared and dedicated. This chapter covers the most common type of Northern Telecom ISL installation, an ISDN Signaling Link (ISL) installation in dedicated mode using dedicated and leased lines. For shared mode implementation, the instructions supplied in the PRI chapter apply except as where noted.

## Hardware Requirements

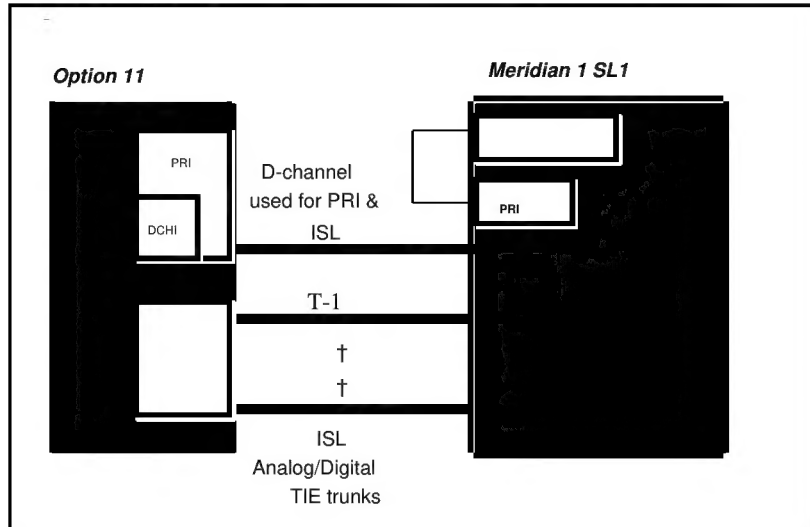
To implement ISL regardless of the mode of operation, analog or digital TIE lines are used as B-Channels:

- NT8D15 or NT8D14 Analog tie trunk cards
- NTAK09 Digital trunk cards (for shared mode)
- NTAK02 SDI/DCH card (for dedicated mode)

### Shared Mode

In shared mode, PRI hardware plus the existing TIE line interface card is required.

**Figure 76**  
**ISL Shared Mode**



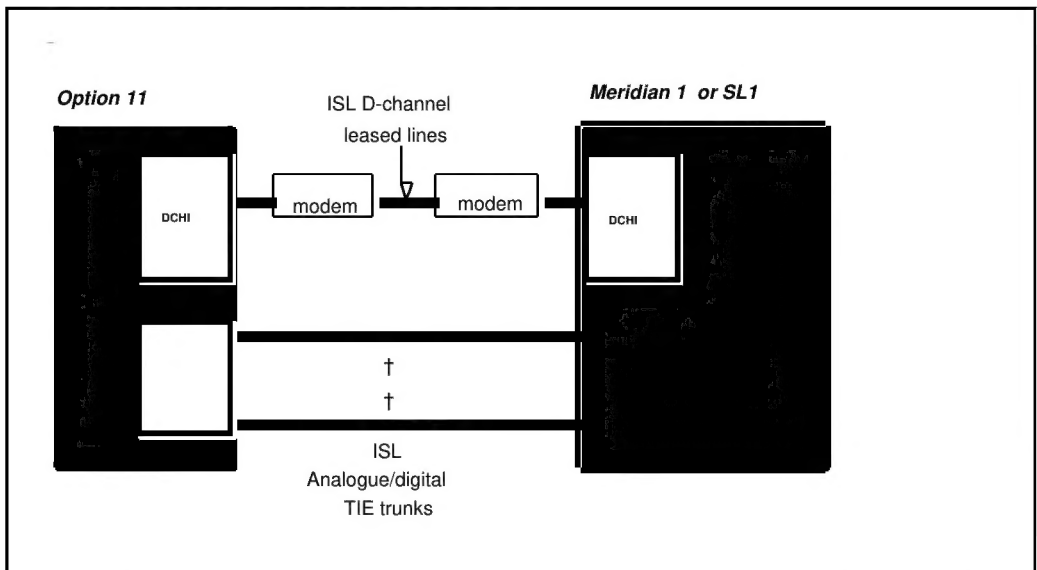
## Dedicated Mode

Dedicated mode requires modems (see [Figures 77](#) and [78](#) for details).

Using Leased Line, the requirements are:

| Hardware | Comments                                                                                                                                                                                                             |
|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| NTAK02   | D-Channel Handler Interface (DCHI) Card for ISL mode                                                                                                                                                                 |
| Modem    | Modem capable of the following:<br>(such as Ventel 2400-33 or 2400 Plus II)<br>-minimum of 2400 baud<br>-synchronous operation<br>-must support leased line (also known as private line or point-to-point) operation |
| NTAK19BA | Four port break out cable                                                                                                                                                                                            |

**Figure 77**  
ISL in Dedicated Mode using Leased Line

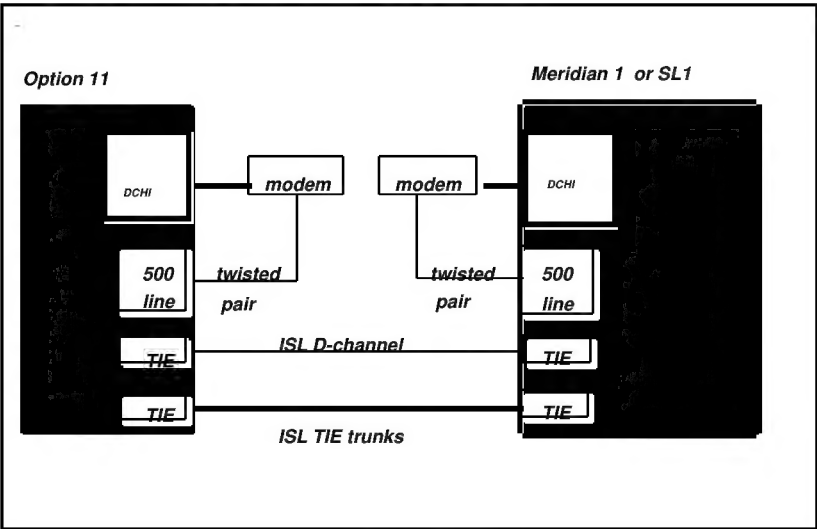


Using Dial-up modems

The requirements are:

| Hardware | Comments                                                                                                                                                                                                                                                            |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| NT8D09   | 500 set line card                                                                                                                                                                                                                                                   |
| NTAK02   | D-Channel Handler Interface (DCHI) Card (for ISL mode)                                                                                                                                                                                                              |
| Modem    | Modem capable of the following: (such as Ventel 2400-33 or 2400 Plus II)<br><br>-minimum of 2400 baud<br><br>-synchronous operation<br><br>-Modems are programmed such that one modem originates the call while the other auto-answers<br><br>-auto-dial capability |
| NTAK19BA | Four port break out cable                                                                                                                                                                                                                                           |

Figure 78  
ISL in Dedicated Mode using Dial-up Modem



## ISL Hardware Installation (Dedicated mode)

Use this procedure to install hardware for an ISDN Signaling Link (ISL) in dedicated mode using dedicated leased lines.

For shared mode, the hardware installation is identical to the PRI installation found in the *PRI implementation* chapter, with the addition of analog or digital TIE trunks or both.

### Restrictions and limitations

The NTAK02 connects to a modem via the NTAK19BA four-port cable. Only ports 1 and 3 are available for use as DCHIs.

### Installation procedure

- 1 Set option switches/jumpers on the NTAK02 card as per the following tables (41 and 42) for mode of operation (RS232 or RS422 and DTE or DCE)

**Table 41**  
**NTAK02 switch setting**

| Port 0 | Port 1 | SW 1-1 | SW 1-2 |
|--------|--------|--------|--------|
| SDI    | DCH    | OFF    | OFF    |
| SDI    | DPNSS  | OFF    | ON     |
| —      | ESDI   | ON     | ON     |

| Port 2 | Port 3 | SW 1-3 | SW 1-4 |
|--------|--------|--------|--------|
| SDI    | DCH    | OFF    | OFF    |
| SDI    | DPNSS  | OFF    | ON     |
| —      | ESDI   | ON     | ON     |

**Table 42**  
**NTAK02 Jumper settings**

| Unit   | Jumper location | Strap for DTE  | Strap for DCE  |
|--------|-----------------|----------------|----------------|
| Unit 0 | J10             | C - B          | B - A          |
| Unit 1 | J7<br>J6        | C - B<br>C - B | B - A<br>B - A |
| Unit 2 | J5              | C - B          | B - A          |
| Unit 3 | J4<br>J3        | C - B<br>C - B | B - A<br>B - A |

| Unit   | Jumper location | RS422          | RS232          |
|--------|-----------------|----------------|----------------|
| Unit 0 | —               | —              | —              |
| Unit 1 | J9<br>J8        | C - B<br>C - B | B - A<br>B - A |
| Unit 2 | —               | —              | —              |
| Unit 3 | J2<br>J1        | C - B<br>C - B | B - A<br>B - A |

- 2 Install the NTAK02 in any available slot 1-10 of the main cabinet.
- 3 Install the NTAK19BA four port cable on the 50 pin Amphenol connector associated with the slot the NTAK02 is installed in.
- 4 If the installation is a dedicated mode using leased line modem configuration, the D Channel connects the DCHI with the far-end modem over a dedicated leased line. The modems must have a minimum transmission rate of 2400 baud and **MUST** support leased line capability and synchronous mode, 2 or 4 wire operation.

Modems such as Ventel 2400 Plus II may be used. You must specify 4 wire operation when ordering, otherwise the modem is factory shipped for two wire operation.

**Note:** The Hayes Smartmodem 2400 cannot be used on leased lines.

- 5 If the installation is a dedicated mode using dial-up modem (such as Hayes 2400, Ventel 2400 or Gandalf 2400) configuration, the DCHI is connected to a modem that is connected to a 500 set line card. The call is connected to the far-end via the 500 set-to-TIE trunk path.

**Note:** Dedicated mode using leased line modems is the preferred method.

- 6 Set up the D-Channel. Program the modem at one end in the auto-dial mode, so it will automatically initiate a call to the other end at power up. The auto-dial number must be coordinated with the far end switch. The originating modem will have this auto-dial number stored internally as part of the modem configuration routine. The far-end modem needs only to be set-up for auto-answer.

## Software Programming

### Programming Meridian 1 to Meridian 1 ISL

ISL is supported only on Meridian 1 to Meridian 1 connections.

There are two modes of ISDN Signaling Link (ISL) operation: Shared mode and Dedicated mode.

#### Shared mode

The NTAK93 DCHI supports ISDN PRI signaling and ISL trunks. The configuration is basically the same as the PRI D-Channel, with the D-Channel also supporting ISL trunks.

The DTI/PRI software programming sequence can be used with the following exceptions:

#### In LD17:

| Prompt | Response | Description                                                                     |
|--------|----------|---------------------------------------------------------------------------------|
| USR    | SHA      | D-Channel for ISL in "shared" mode, used for both ISDN PRI and ISL.             |
| ISLM   | 1-192    | number of ISL B-channel (trunks) controlled by the D-Channel (no default value) |

**In LD16:**

| Prompt | Response | Description                                                           |
|--------|----------|-----------------------------------------------------------------------|
| IFC    | SL1      | interface type must be SL1 (this is the only type supported for ISL). |
| MODE   | ISLD     | TIE route used for ISL members.                                       |
| DCHI   | 0-15     | DCHI port number                                                      |

**In LD14:**

| Prompt | Response | Description                                                                |
|--------|----------|----------------------------------------------------------------------------|
| CHID   | 1-192    | channel identifier for ISL channels. Must be coordinated with the far-end. |

## Programming Dedicated mode

Use this procedure to configure basic ISL capability.

The following programming applies to analog TIE trunks being used as B-channels. When DTI/PRI trunks are also used, LD17 digital loop (DLOP) and LD73 (digital data block-DDB) must also be configured with the appropriate clocking and threshold settings.

### Restrictions and limitations

The DCHI in this case uses the NTAK02 circuit card and does not support ISDN PRI signaling. The DCHI is reserved for ISL use only. The D-Channel can communicate with the far end by means of a dedicated leased line modem or dial-up modem.

For ISL dedicated mode using a dial-up modem, a 500 set, TIE trunk route and member will have to be programmed (used for D-Channel).

### Programming procedure

Programming dedicated mode involves four major steps:

- 1 Configure the D-Channel for ISL — use LD17
- 2 Enable ISDN option — use LD15.



- 3 Enable the ISL option on a per route basis, assigning a D-Channel for each route — use LD16.
- 4 Assign a channel identification to each trunk with the ISL option — use LD14.Step 1:

**Step 1**

Configure the D-Channel for ISL. Use LD17)

| Prompt | Response        | Description                                                                                                                                                                                                                 |
|--------|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| REQ    | CHG             |                                                                                                                                                                                                                             |
| TYPE   | CFN             | configuration data block                                                                                                                                                                                                    |
| ADAN   | NEW DCH<br>1-15 | add primary D-channel                                                                                                                                                                                                       |
| CTYP   | DCHI            | D-channel card type                                                                                                                                                                                                         |
| CDNO   | 1-9             | Card slot in which the card supporting the DCHI resides                                                                                                                                                                     |
| PORT   | 1               | must be set to 1                                                                                                                                                                                                            |
| USR    | PRI             | D-channel for ISDN PRI only                                                                                                                                                                                                 |
| IFC    | SL1             | Interface type                                                                                                                                                                                                              |
| DCHL   | 1-9             | PRI2 card number. (Must match entry for CDNO.)                                                                                                                                                                              |
| SIDE   | NET (USR)       | Net: network, the controlling switch<br>User: slave to controller                                                                                                                                                           |
| RLS    | XX              | X11 software release of far-end. This is the current software release of the far end. If the far end has an incompatible release of software, it prevents the sending of application messages, i.e. for Network Ring Again. |
| CLOK   |                 | D-channel clock type for signaling                                                                                                                                                                                          |

| Prompt | Response  | Description                                                                                                                                                                                                                                                                                                                                                                                                                      |
|--------|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|        | EXT       | source of D-channel clock is external to DCHI card (in this case the DTI/PRI circuit card). Normally, EXT is used for PRI/ISL. Note: do not confuse this clock with the E1 span Clock Controller found on the NTAK10/79. This clock is in reference to the DCHI synchronous mode of operation. (Note: If directly connecting two DCHI ports with out the use of modems, set "CLOK" to "EXT" on one side and "INT" on the other). |
| LAPD   | YES,(NO)  | change LAPD parameters. Simply carriage return if timers are to be left at default value. The following timers are prompted only if LAPD is set to YES. The following can all be left at default during initial set-up.                                                                                                                                                                                                          |
| T23    | 1-(20)-31 | interface guard timer checks how long the interface takes to respond. In units of 0.5 seconds (default 20 = 10 seconds).                                                                                                                                                                                                                                                                                                         |
| T200   | 2-(3)-40  | retransmission timer in units of 0.5 seconds (default 3 = 1.5 seconds).                                                                                                                                                                                                                                                                                                                                                          |
| N200   | 1-(3)-8   | maximum number of retransmissions                                                                                                                                                                                                                                                                                                                                                                                                |
| N201   | 4(260)    | maximum number of octets in information field                                                                                                                                                                                                                                                                                                                                                                                    |
| K      | 1-(7)-32  | maximum number of outstanding unacknowledged frames (NAKS)                                                                                                                                                                                                                                                                                                                                                                       |

**Step 2**

Enable ISDN option. Use LD15.

| Prompt | Response        | Description                                                                                                                                                                                                                                      |
|--------|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| REQ    | NEW,CHG         |                                                                                                                                                                                                                                                  |
| TYPE   | CDB<br>NET_DATA | customer data block<br>Release 21 gate opener                                                                                                                                                                                                    |
| CUST   | 0-31            | customer number                                                                                                                                                                                                                                  |
| ISDN   | YES             | customer is equipped with ISDN                                                                                                                                                                                                                   |
| PNI    | 1-32700         | customer private network identifier. This number MUST be unique to this customer in the private network. e.g. it is used to as part of the setup message for feature operation such as Network Ring Again and Network ACD.                       |
| HNPA   | NPA             | telephone area code for this Meridian 1. Sent as part of setup message as calling line identification.                                                                                                                                           |
| HNXX   | NXX             | telephone local exchange code for this Meridian 1. Sent as part of setup message as calling line identification.                                                                                                                                 |
| HLOC   | XXX             | home location code (NARS)                                                                                                                                                                                                                        |
| LSC    | 1-9999          | one to four digit Local Steering Code established in the Coordinated Dialing Plan (CDP). The LSC prompt is required for Calling Line I.D. and Network ACD.                                                                                       |
| AC2    |                 | Access Code 2. Enter call types (type of number) that use access code 2. Multiple responses are permitted. This prompt only appears on NARS equipped systems. If a call type is not entered here, it is automatically defaulted to access code 1 |
|        | NPA             | E.164 National                                                                                                                                                                                                                                   |
|        | NXX             | E.164 Subscriber                                                                                                                                                                                                                                 |
|        | INTL            | International                                                                                                                                                                                                                                    |
|        | SPN             | Special Number                                                                                                                                                                                                                                   |
|        | LOC             | Location Code                                                                                                                                                                                                                                    |

### Step 3

Enable the ISL option on a per route basis, assigning a D-Channel for each route. Use LD16.

| Prompt | Response    | Description                                                                                                                                                                                                         |
|--------|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| REQ    | NEW,CHG     |                                                                                                                                                                                                                     |
| TYPE   | RDB         | route data block                                                                                                                                                                                                    |
| CUST   | 0-31        | customer number                                                                                                                                                                                                     |
| ROUT   | 0-30,32-127 | route number                                                                                                                                                                                                        |
| TKTP   | TIE         | TIE trunk route                                                                                                                                                                                                     |
| DTRK   | YES/NO      | enter YES if this is a Digital Trunk Interface (DTI or PRI)                                                                                                                                                         |
| ISDN   | YES         | ISDN option                                                                                                                                                                                                         |
| MODE   | ISLD        | Route for ISL application                                                                                                                                                                                           |
| DCHI   | XX          | DCHI port no. in CFN which will carry the D-Channel for this TIE trunk route.                                                                                                                                       |
| PNI    | 1-32700     | customer private network identifier- <b>must be the same as the CDB PNI at the far end.</b>                                                                                                                         |
| IFC    |             | interface type                                                                                                                                                                                                      |
|        | SLI         | select Meridian 1 to Meridian 1                                                                                                                                                                                     |
| CTYP   | <CR>        | Call Type. Enter the call type to be associated with the outgoing route for direct dialing using the trunk access code (instead of NARS access code) See the Option 11 Software Guide for a list of valid responses |
| INAC   | YES         | Insert Access Code. Permits the NARS AC1 or AC2 access code to be re-inserted automatically on an incoming ESN call.                                                                                                |

**Step 4**

Assign a channel identification to each trunk with the ISL option. Use LD14.

| Prompt | Response | Description                                                                                               |
|--------|----------|-----------------------------------------------------------------------------------------------------------|
| REQ    | NEW,CHG  |                                                                                                           |
| TYPE   | TIE      | TIE trunk type                                                                                            |
| TN     | CC UU    | Card (CC) and Unit (UU) to be associated with this trunk data                                             |
| RTMB   | RRR MMM  | route (created in step 3) (RRR) and member number (MMM)                                                   |
| CHID   | 1-192    | channel identifier for ISL channels (remove with Xnn)—must be coordinated with far end (no default value) |